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ROCKS and MINERALS

A Magazine for Mineralogist, Geologist and Collector . . . .

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. . . . . Official Journal of The Rocks and Minerals Association

.. JANUARY, 1937 ..

Vol. 12, No. 1 FIFTEEN CENTS Whole No. 66

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ROCKS and MINERALS

PUBLISHED MONTHLY

Edited and Published by PETER ZODAC

JANUARY
..1937..

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The Official Journal of the Rocks and Minerals Association

CHIPS FROM THE QUARRY

(Formerly the Bulletin Board)

COLLECTORS, FORM IN LINE!

Elko, Nevada — I am enclosing $1.00 for the Special Agate Number. It was a very, very fine issue and certainly one of the most interesting numbers of a mineral magazine I've ever seen. I only wish you would publish a special number each month; I, for one, would gladly pay 1.00 per issue if you did. The enclosed dollar represents what I should be willing to pay for a number of such a magazine. — Lester W. Mills.

THE KING'S JEWEL

(Author Unknown)

"There was an outcry in the king's splendid court as a man with signs of unutterable weariness pushed into the royal presence. Breathing hard, angry, careless of courtesy, he drew from his breast a jewel-a great blue stone-and hurled it at the king's feet-then turned to depart. "Stay" cried the king, "whose is this jewel and what did you do with it?" The man answered insolently, "I thought it to be yours." "And where did you get it?" "And old servant gave it to me when I was a lad. He said it was the Blue Stone of Truth-perfect, flawless, priceless. I was to guard it, never to part with it,—until one day I should return it to the king. I have done all. I have carried it near my heart during frosty nights and glaring hot days. Gold could not buy it. Through peril, storm, hunger, battle and temptation I have kept it and treasured it. But today as I entered your court I discovered that the jewel has a great flaw and is worthless. I have given my life for a lie." The king answered, "Give me my jewel. Has it not taught you courage, and hardihood, and patience? Have not labors brought you strength! Perils wisdom! Wounds endurance? Has it not lifted you above sloth and fear, and given you purpose in living? You say it is imperfect! Look at the wonder! Behold! —The seeming flaw in its depth has become a star!"

WHO SECONDS THIS?

Colton, Calif. — When I read a good article in a magazine, it has greater value to me if address of author and some facts (instructor, collector, salesman, etc.) appended. Is there any reason why we should not be given some background for an author in ROCKS *and* MINERALS? — S. C. Edwards.

CANON CITY GEOLOGY CLUB

"Why not?" replied the president of the club when a voice from the floor said "Let's study non-metallics this year!"

"Sure, I'm for it," said another voice. "Then we can go up to the feldspar quarry where the feldspar, rose quartz and mica glisten so it hurts your eyes, and to the vermiculite plant and see the hot air exfoliate the mineral. We can also get specimens at the marble works, of the many colored heaps of terrazzo marble down there. The heaps look just like so many shocks of hay in colors, red, white, black, gray, pink, and green. You know Canon City, Colorado, holds the world's record in the output of these minerals." "Alright, alright" said the president, whose name is Avo Rogers. The secretary is Sarah Jane Colgan.

The club organized again this year with thirty members and voted unanimously to adopt Rocks and Minerals as the club magazine.

F. C. Kessler, Sponsor.

Jake Miller, City Hall Custodian of Bridgeport, Conn., and who owns one of the finest mineral collections in the State, has part of his collection on exhibit at the Burroughs Library in his city. The collection, embracing choice specimens from all over the world, many of which Mr. Miller personally collected, is being widely admired and is creating considerable interest. Collectors passing through Bridgeport are advised to stop at the library and view the collection.

Mr. Miller is a member of the Rocks and Minerals Association.

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The Official Journal ROCKS and MINERALS of the ASSOCIATION

WHOLE No. 66

THE EDITOR GOES AFIELD

HIS EXPERIENCES ON A FOUR DAY COLLECTING TRIP

By PETER ZODAC

Editor of Rocks and Minerals

It was a beautiful sunny morning, Sunday, Sept. 6, 1936, when Dr. and Mrs. John R. Evers of North Tarrytown, N. Y., pulled up at my house, opened the door of their car and said, "Jump in and let's go!" I jumped, and we were off—for a four day mineralogical trip through northern New York. We left at 11:10 A. M. and had not traveled far when Dr. Evers spied a bluish incrustation on the rocks in the road cut just south of Graymoor.

"What's that?" he yelled to me, but not slowing up at all.

"That's riebeckite," I yelled back, not to be outdone, "and it's a new mineral for you. Stop and I'll get you a specimen.

"We will get it on the way back," he replied and in a lower tone.

"O. K." I whispered. But we never got any as it was late at night when we passed there again homeward bound.

Up the beautiful Hudson River Valley we rolled, on Route 9; through Poughkeepsie, the Bridge City— famous for its crew races; through Hudson, home of two eminent mineralogists, Andy Dargis and Carl Klein; through Albany, the capitol of the State, where we switched over to Route 5; and into Schenectady, the Electrical City where we stopped, 2:45 P. M., to see our new printers, The Franklin Print Shop on Broadway. I had made arrangements with Mr. Apollo, the proprietor, to meet us at his office and he was in. We spent about an hour inspecting his extensive plant and went away feeling that at last we had contacted a good printer and that ROCKS and MINERALS would be safe in his hands.

From Schenectady, we followed the Mohawk River, still on Route 5, up the beautiful Mohawk Valley. Just before we reached Fonda, we saw a peculiar looking building about a mile or so to the south and in a large open area. I wondered what it could be and my curiousity was soon satisfied, for a large sign near Fonda stated it was the Auriesville Shrine, which has been erected by the Catholic Church to commemorate an Indian Maiden—The Lily of the Mohawk. Being a Catholic, I would have liked to have visited it, but we were on a mineral trip, not on a pilgrimage.

We stopped for lunch at a small road stand and then headed for Little Falls, still on Route 5, which we reached at 6:30 P. M. (186 miles from Peekskill).

Our immediate approach to Little Falls was through a wide gorge having vertical cliffs of limestone, but once in the city we found it to be a delightful little town.

Our first thought in Little Falls, was to call on Mr. W. J. Hollister, a col-

lector and dealer and member of the Rocks and Minerals Association. Unfortunately we did not know his street address and inquiries failed to locate him but we did learn that in the high hill across the river rock crystals used to be very abundant, that people for many years collected them at the base of the hill; that one good spot was in a dirt slide back of the city's shed, alongside a road—the crystals occuring in the loose soil. So we drove over the river and found the hill to be a bluff, hundreds of feet high, consisting of a gray, flat bedded, limestone. We searched diligently but all that could be found were some miserable fragments and two tiny calcite cleavages—all found by Dr. Evers. I happened to be standing on the sidewalk as three girls walked by and out of curiosity asked them if they knew where Mr. Hollister lived.

"Do you mean the man who has four nice daughters?" replied one of the girls.

"You have me there?" I answered, not even knowing if Mr. H. was married "but if the girls are nice it may be he is their father".

The girl gave me directions for reaching his house but it was in Newville (I immediately recalled that this was where he lived) and we were off again. Newville proved to be a little community, 8 miles south of Little Falls, but to my regret Mr. Hollister was not at home—so back to Little Falls we returned.

From Little Falls we took Route 169 for Middleville—9 miles to the north—where we arrived at 8:30 P. M. Here we put up for the night and secured accommodations at a tourist home on S. Main St., conducted by Mr. and Mrs. Fred G. Raithel.

Middleville is a small village of about 800 population whose chief industry is a leather factory but it is noted the world over as a locality for quartz crystals, the famous Herkimer County "diamonds". I engaged Mr. Raithel in conversation regarding the crystals and found to my delight that he knew of their occurence and gladly gave me much information of value. Further still, he telephoned a local historian, Miss Myra C. Burns, arranged for a visit, and took me to her home, where I obtained so much additional interesting information as to be induced to prepare an article on the quartz crystals of Middleville* —Miss Burns was a most charming lady, very gracious and cordial. She has an excellent historical library and posseses some of the finest rock crystals I have ever seen. The half hour spent at her home was a most delightful experience and it was with regret I had to leave so soon.

In passing I heartily recommend the Raithel house to all collectors who may want to visit Middleville and spend a night or two there.

Total milage covered this day was 214.

2nd. day — Monday, Sept. 7th.

We got up about 7:30 A. M., had breakfast at the Raithel house, said good bye, and were off for the crystal locality. We turned left at the corner into Route 28, about 100 feet away and opposite the drug store, went past the leather factory, over the bridge spanning West Canada Creek, turned left at the corner and headed south.

On the edge of the town perhaps 1,000 feet from the above corner, is the milk plant of the Dairymen's Cooperative Association. This is on the left side of the road. Directly opposite the plant, is a limestone ledge that stretches southward for about 500 ft. It is dark gray, horizontally bedded, and averages 8 feet in thickness. In this limestone are many pockets and cavities, varying from tiny ones up to 2 or 3 feet in diameter—the latter often being 5 feet in depth. It is in these pockets the rock crystals occur but while we searched high and low the pockets had been picked and were empty of crystals, although they were coated with drusy quartz of no value. The pockets showed many evidences of having been worked for crystals but an hour's search failed to uncover a decent specimen, so throughly had they been cleaned out. We had not been there long before a native came down to see us bringing with him an assortment of crystals

*This article will appear in our *Rock Crystal* number.

for sale. His little house was on top of the limestone ledge and a few feet back. But his crystals were not of good quality and we bought none. At regular intervals, old men came down the road and in every instance they too tried to sell us crystals; the crystals however were at home and we would have to go there for them. As the men were from the County Poor House, about a mile down the road, it may have been they had no crystals but simply wanted a ride. At any rate we did not bite. Not finding crystals in the ledge we continued 500 feet further south to "Diamond Brook", which happened to be dry. We spent another hour breaking up rock in it (it had a rock bottom that seemed to extend along its course to the top of the mountain) hoping to get a crystal or two but our efforts were all in vain. I hinted more than once to Dr. Evers that we should be on our way but he would not leave. "I've got to find a crystal first," he kept saying over and over again. Finally in desperation I made a swat at an inconspicuous looking slab of rock. It split in two, when lo and behold! in a little pocket was a crystal and a good one too. "There is your crystal, Doc," I chirped, feeling rather important. "now let's go." And with that I made a swat at an adjacent slab. It parted and another crystal burst into view. But I had been too rough; the crystal was ruined. However the doctor was satisfied and we soon left.

We retraced our route into Middleville and then continued northward on Route 28 for Antwerp, where a noted hematite mine, the Sterling Mine, was located.

.ix miles north of Middleville is Newport, also a small community. A large quarry about 100 feet to the right of the road, in approximately the center of a small level valley, attracted our attention and we headed for it. It was working and proved to be a dark gray, horizontally bedded limestone, but not a single mineral could be found.

We continued our journey northward, following the valley for many miles and passing through a number of picturesque little villages and hamlets. Dark gray, thin layered, horizontally bedded limestone outcropped at intervals all the way up to Natural Bridge and beyond, giving way here and there to a dark red gneiss.

At Trenton we took Route 12; at Boonville Route 12-D.

A few miles north of Boonville, a range of mountains loomed up in the distance, on the right, which I believe were the foothills of the Adirondacks, New York's most extensive and highest mountains. At this time a slight drizzle began to fall which lasted about an hour, stopping intermittently. At Lowville we took Route 26, reaching Carthage 12:45 P. M. We thought of eating, but decided to make first a side trip to Natural Bridge, five miles north of Carthage and on Route 3.

We found Natural Bridge was another small community and that it received its name from a "natural bridge" about 200 feet wide, which spans a tributary of Indian River and over which the highway passes. A fee of 10 cents was charged to see the 'bridge' plus an additional fee of 25 cents for a boat ride under it. We took in both. We descended a small flight of rough stone steps, about 30 feet down, and saw a cavern possibly 50 feet wide and perhaps 10 feet high. The guide said the river, about 100 feet away, used to flow into the cavern but had been dammed off. Nevertheless a little stream still trickled in it. A small, flat-bottomed boat was at the entrance and the three of us got into it, as did also the guide. Momentum for the boat was obtained by pulling upon a cable fastened to the roof. A bright light, attached to the front of the boat, illuminated the passage way. We went straight ahead for about 300 feet, ducking most of the way as the roof was very low, then we turned and went at right angles for about another 300 feet. No cable was here, the guide propelling the boat by grasping the roof, which was low here too. The water was shallow, though in places it was 3 feet deep, clear and cold. At its widest spot the cavern might be 60 feet but it was choked

up with logs, barrels, large rock slabs, and other junk; which the guide explained had been washed in during high water. Hence the dam to keep such material out. Furthermore, the guide advised, they were going to clean out the rubbish and otherwise improve the cavern.

The overhead rock was a light gray banded limestone with a very smooth surface. Many small knots of black "material" hung down from the roof (stalactic in form), which the guide said was granite and to some of these the cable was attached. I do not believe they were granite (perhaps only quartz) as at the entrance limestone was noted in the floor of the cavern. It was not possible for me to break off a specimen and examine it nor I could account for the smoothness of the roof. At the two extremities of the ride, small, apparently natural openings to the surface, were pointed out to us. The boat ride was not thrilling nor was the cavern spectacular.

I inquired of the guide if he ever heard of the Ashmore farm, an old locality for interesting minerals but he never had although he had lived in the town for 61 years. The ticket seller had never heard of the farm either but gave us directions for reaching a talc mine nearby that was operated by the Carbola Chemical Co. We continued on the road, over the bridge, (Route 3) for two miles until we came to a dirt road leading off to the left with a sign reading "Carbola Chemical Co.". About 500 feet in, a fairly large plant for treating the talc, burst into view. No one appeared to be around and we followed the road to the left where we ran across a watchman. The mine proved disappointing as very few minerals were available though a soft, friable serpentine was plentiful. To the extreme left of the plant was a small inclined shaft, the main opening to the mine, which the watchman said was about 500 feet deep.

We retraced our route to Natural Bridge, had a light lunch at a neighboring stand, and then continued our journey to Antwerp.

Antwerp is a delightful little village and I could have lingered awhile but there was no time for this. We inquired directions at a gas station for reaching the mine and learned that there were two mines—the Dickson and the Sterling. Having entered Antwerp by way of Route 26 we left on it. Near the outskirts we crossed a railroad; ½ mile further we turned right on Route 11; ½ mile further we again turned right and about a mile still further we came to a small gas station to the left of the road and opposite a red barn. The mine was somewhere behind the barn. We asked of men working around the barn directions for reaching the mine and were told it was a short distance off but we would have to walk as no road was available. We were led to believe the distance was short, about 500 feet, but after walking about 1,000 feet, we spied the waste dumps at least ½ mile further on, across large open fields. The doctor suggested abandoning the trip.

We therefore headed for the Sterling Mine, a mile further up the road. Here we met with a situation that almost spelled ruin for us. The road to the mine is opposite a house and is poor and narrow on a down grade running off the right of the main road. It is called the "Red Ore Road" and its name is very appropriate for at the bottom of the grade it goes through a swamp and becomes very wet, deep-red from the ore, and gooey. We did not realize its condition until we reached the very center of the swamp and began to sink in. It was too late to back up and so we put on the gas and shot forward. Fortunately the soft spot was only 200 feet in length and we made it safely but—how about the return? This had me so worried that collecting at the dumps was not so pleasant.

The mine is about ½ mile in from the main road and consists of a large pit sunk in a flat level field. How they ever discovered ore in this area is a mystery as the mine is practically in a swamp. Putnam[1] states the

1 Putnam, B. T. 10*th Census Report*, 1880, Washington, D. C., 1886, p. 143

pit is about 400 feet long, 175 feet wide and at its southern end 120 feet deep. It is now full of water and contains three small islands. The ore dumps are small and not extensive. Hematite was plentiful and consisted chiefly of the red massive variety; small amounts of the black, crystallized variety were also found. Two or three small specimens of millerite, a number of stilpnomelane, and other types were also secured here.

Finally the time came for us to leave and I began to worry anew. We started off. Soon the swamp was reached—and then the struggle commenced. Slowly we began to move. One time we were in a deep rut—but we got out of it. Next we were on top of a small elevation—then the car made a lurch and I thought we would surely land in the swamp—but never once did the Cadillac falter. Slowly but surely we moved onward, when with a sudden spurt the car shot upward on solid ground and we were out of danger. From that time onward, I never doubted the car's ability, but the Cadillac was a sight. The wheels, running board and under carriage were coated a deep red. It surely was a sight but it was all in the day's work. It is interesting to note that a number of people later met in other sections of the State, and who were familiar with the Sterling Mine, could tell from the car's appearance that we had been there.

We retraced our route for two miles, and turned right for Oxbow, 7 miles away. Oxbow is a very small community and we went through it like greased lightning. Our destination was Rossie, 7 miles further to the north where we were to visit a lead mine.

Rossie was a very disappointing place. The village was small and appeared run-down, as if it had been deserted. Nevertheless we inquired of a native for directions which were cheerfully given. We learned that the mine was on the property of Chas. O'Hara, a mile back. So we turned around and retraced our route. O'Hara's farm was just ½ mile south of the cemetery, on the right side of the road. Two houses are here, O'Hara's being to the left, and a road passes between them and goes to the mine about 500 feet in. A high stack was plainly visible from the main road but on our way up we failed to see it on our left. Perhaps we were looking the other way. A young lady was out in front, talking to some friends in a car, and she graciously gave us permission to visit the mine.

The mine was somewhat of a surprise. It was located in an open section, almost surrounded by pasture land. but a vertical cliff of rock, 50 feet high, having all the earmarks of a dike, and extending northwest contained the ore body. A vertical shaft, 8x15, had been sunk at its extreme southeastern end. But the mine had long since been abandoned and it was difficult to make any careful examination. Besides, our time was limited and we only had a few minutes to collect specimens. The dump was fairly large and consisted chiefly of white calcite rhombs of good quality. Some chalcopyrite, galena, and sphalerite were found but on the whole they were of poor quality. It was plainly evident, however, that someone had been a recent visitor as many specimens were found freshly broken. On the way out Mr. O'Hara met us at the house to inquire if we had enjoyed ourselves. From him we learned that the mine was the Victoria; that it was about 300 feet deep and had been shut down about 1865; that many collectors visit it—a day or so before four having been there. Furthermore, he said that down the road (south) about ½ mile, a road led off to the right and up this road about a mile was the Coal Hill Lead Mine, somewhat similar to the Victoria. A cheese factory was at the entrance of this road where it led off the main highway. On parting, Mr. O'Hara invited us to come again and then presented us with two very fine loose crystals of galena from the Victoria Mine.

We continued southward, passed the road and cheese factory mention-

ed above but not having time to visit the mine crossed the bridge (300 feet further) spanning Indian River and were back in Oxbow. About a mile below Oxbow we turned left for Gouverneur, where we wanted to visit some quarries but found on investigation we had passed them and so continued onward, on Route 58, for the zinc mines at Edwards. Just as it was getting dark, we came to a little abandoned mine 25 feet to the left of the road. Ruins of a vertical and an inclined shaft were here. The small dump yielded many fine specimens of crystalline and foliated hexagonite. It began to drizzle slightly but we paid no attention to it. In trimming large specimens of hexagonite, sparks were easily given off so that it was simple to identify the mineral in the dark. We would pick up a specimen and hit it with a hammer; if sparks were given off it was hexagonite; if no sparks, it was something else and was thrown away.

Just as we were about to enter the car, a man appeared from somewhere. I spoke to him regarding the mine. No answer. I spoke again and louder. Still no answer. Finally I yelled and he heard me. He was evidently very hard of hearing but it was strange how he could pass so close to the car and not see us. Nevertheless we got the desired information. The mine had been operated for talc by the W. H. Loomis Co.; it was Mine No. 2, near Fowler, shut down about six years ago and was about 500 feet deep.

We continued on to Edwards where we arrived at 8:00 P. M. after travelling 168 miles for the day. We stayed in Edwards over night at Mrs. Frandy DuLack's.

3rd. day — Tuesday, Sept. 8th.

We had breakfast at Mrs. DuLack's and about 8:30 A. M. hit the trail again. We did not have far to go for our first stop as the zinc mines are in Edwards, a bustling little town of about 900 population whose main industry is the zinc mine. The mine was working. We called at the office to get permission for visiting the dumps, and by good fortune met Mr. John Brown, the geologist, a very pleasant young man who made us feel right at home. First thing he did was to show us some minerals in his office among which were very fine specimens of sphalerite, pyrite, galena and precious serpentine. These were from the mine. To our amazement we were told that willemite, as minute, translucent, queer glassy crystals in talc, occured in the ore, but at the Balmat Mine, 10 miles north of Edwards; that ilvaite, as small black needles or prisms also occured at the Balmat Mine and in the wall rock. Good specimens of these two minerals were shown us. In the course of conversation, Mr. Brown said that the Edwards Mine was opened up 1915; that it is 1900 feet deep vertically; and is owned by the St. Joseph Lead Co. After the examination of the specimens, Mr. Brown took us out on the dump and said; "Here it is; the dump is yours." The dump was a large one and consisted chiefly of serpentine, calcite, and much sphalerite with pyrite. One of our finds (by Dr. Evers) was a large blue apatite which Mr. Brown said was the largest he ever saw from there. On parting, Mr. Brown graciously presented us with specimens of ilvaite and willemite which we were very glad to have.

From Edwards we took Route 58 for Fine, 9 miles away, which turned out to be a sleepy little hamlet of about a dozen houses. We inquired for the old Scott farm and were directed to Frank Scott, about 5 miles further, and on the same route.

About ½ mile out of Fine, two bridges, close together, cross the Oswegatchie River. At the 2nd brindge and first pier to the left, is a 3 foot dike of pegmatite. Here we collected some very nice crystals of brown titanite, fluorite and augite. We were indebted to Mr. Brown of the zinc mine for information as to this locality. A sawmill is to the left of the dike, while the road over the bridge goes to Watertown.

About 3½ miles from the locality we crossed a long concrete bridge; at its end and about 300 feet to the right is the home of Frank Scott. The old Scott farm was noted as produc-

ing some interesting minerals and we were anxious to visit the locality if possible. Fortunately Mr. Scott was available and received us cordially.

"I guess the place you want is the old fluorite mine,'. he said' "This was discovered about 1902 by Philo Scott, a relative, who ran across fluorite on the surface of the ground. In 1915, Lux Developing Co. of Syracuse, N. Y., who were developing a feldspar prospect (a small pit containing feldspar, iron pyrite and some fluorite not far away) also dug the fluorite pit; four men spent two days in working it. My father (Fred Scott) and I also worked two weeks there. The pit was dug chiefly for fluorite but it contained so many different minerals that there were not enough of one to work."

The mine was about a mile up the dirt road, past his house, and out in the woods. He gladly guided us to the spot as it would have been impossible for us to find it from directions as there were no landmarks. We had to cross fields, wade through wet brush and bushes that were up to our armpits. It had been sometime since Mr. Scott visited the pit and during the intervening years many trees and bushes had grown up so that for awhile we were in despair of finding it. Finally we ran across it and to our disappointment it was a very small pit—12 feet in diameter, 6 feet deep and full of water. A 10 foot tunnel, whose roof was studded with fluorite, goes off to one side and underwater, advised Mr. Scott.

Unfortunately there was only a little dump and what material was available was of no importance. Tiny cleavages of almost colorless fluorite (it was purple but had faded Mr. Scott said) was the best of the lot. This was the most disappointing visit of the entire trip as we had to walk about a mile, through wet bushes and get nothing. We later learned that the feldspar locality, which was easier to reach, was the spot that we should have visited.

From there we proceeded for Benson's Mines, 10 miles away. This turned out to be a huge open cut about 1500 feet long, 200 feet wide and from 20 to 50 feet deep. It was dry but overgrown slightly with grass and bushes. The ore was magnetite but what was seen was of poor quality and mixed with rock. Huge slabs of rock were all around but very few specimens and these of poor quality. It was another disappointing locality and not worth a visit. At one time the mine had a very large plant but it is all in ruins now and abandoned. It is evident that when the mines closed down the town (of the same name) did likewise, as no one seemed to be about and the railroad station, a few hundred feet away, also seemed to be abandoned.

We continued onward to Ausable Forks, about 117 miles away on Route 3, which took us through the heart of the Adirondack Mountains. We passed Cranberry Lake, went through Piercefield which contains a large pulp mill, while thousands of logs used in paper making were in a nearby lake. Further on we came to the apex of a long hill from which a magnificent view of Tupper Lake and village of the same name could be seen, miles ahead. We stopped in Tupper Lake Juntion at Central Rest where we had dinner at 2:15 P. M.

At Tupper Lake village, 2 miles further, we stopped again, where Dr. and Mrs. Evers did some shopping. Tupper Lake is an attractive little village of 5,000 population. It was a metropolis compared with some of the tiny hamlets and settlements we had been passing through the last two days and I was about as observent as a small boy at a circus. One thing especially did I notice—the large number of red-headed girls. I never saw so many anywhere. In about 10 minutes, at least 15 went by, and it wasn't the same girl either. And what was more important, they were all good looking. So if any of our male readers like good looking red-headed girls, my advise is—go to Tupper Lake.

Our route took us through Upper

Saranac Lake, Lake Clear, and Saranac Lake village, through High Falls gorge and Wilmington Notch (on Route 86) but we did not stop to examine either the gorge or notch. We also passed the road that leads to Whiteface Mountain. Had it been earlier in the day we would have gone up Whiteface as somewheres along the route very fine allanite crystals (which have been described by Dr. Newland.[2]) had been uncovered during the construction of the road up the mountain. But we continued on and pulled into Ausable Forks 5:00 P. M.

At Ausable Forks, a typical Adirondack village, is the quarry of the Carnes Granite Co. We were fortunate in finding Mr. Fred G. Carnes, owner of the quarry, at his plant. He was much surprised to see us as our visit was wholly unexpected (he and his family had visited the offices of Rocks and Minerals about a month previous). He received us cordially, proceeded to show us over his large and extensive plant; likewise the quarry which produces a dark green syonite that takes an excellent polish and is in keen demand for monumental uses. The quarry is 1400 feet west of the plant and is about 400 feet long, 50 feet wide and 20 feet high. Aside from the syenite, no mineral specimens were available.

Of course we had to call on Mrs. Carnes and the family, and once there they all insisted that we remain for supper. While Dr. and Mrs. Evers were inside, enjoying a good rest, I was outside playing croquet with the girls. To my chagrin, the girls beat me every time; I could not even hold my own and were it not for some youngster of 6 or 7, I would have been last every time. The Adirondack lassies had no mercy on me, a poor, city boy. They should have allowed me to win at least once.

It must have been about 7:30 P. M. that Mr. Carnes happened to think of a geological formation, a roll in Grenville limestone, about 2 miles away, which he insisted we should see before leaving. It was dark as we left and was darker when we got there but by turning the lights of the car on it, we could see the roll plainly. It was an excellent exposure and well worth the trip. It was from this exposure that Mr. Carnes had sent me a specimen of limestone which phosphoresced in two colors, greenish-blue and golden brown.[3]

About 8:00 P. M., we bade the Carnes good bye and headed south for Port Henry where we planned to spend the night. Unfortunately in the dark we missed the road and rather than go back looking for it, we decided to spend the night at The White Lodge on Route 9, where we pulled in at 10:00 P. M. after covering 194 miles for the day.

4th and last day, Wed., Sept. 9th

Bright and early we got up the next day, had breakfast at the Lodge, and left for Mineville. We went back on Route 9, 14 miles, and turned right on a road marked "To Port Henry". Five miles in on this road a quarry suddenly came into view on our left and we stopped to investigate it. It was not being worked. It was 100 feet in diameter, 50 feet high where it cut into the mountain, and was adjacent to the road. The rock was a coarse, grayish, crystalline limestone and we collected 14 minerals as follows:— apatite (green xls), augite, biotite, calcite, chalcopyrite, garnet, graphite, limonite (stain), hornblende, phlogopite, pyrite, pyrrhotite, serpentine, and tourmaline in two colors, black and brown. We later learned this was the Town Quarry—evidently Town of Moriah Quarry.

Three miles further an old blast furnace was noted 15 feet to the right of the road; three miles still further we came to a beacon where we turned left for Mineville (Port Henry straight ahead) 1 mile to the north.

Mineville was not an attractive town; just a miners' village and nothing more—at least the part which we saw. The main industry is the iron mines which were working and which are the largest in the State. I stopped

2 Newland, D. H. *Minerals of Whiteface Mountain*. ROCKS *and* MINERALS, June 1935, pp. 81-82.

3 Zodac, Peter. *Some Interesting Phosphorescent Minerals*. ROCKS *and* MINERALS, May, 1936, p. 75.

at the office for two reasons; 1st to obtain permission to collect specimens on the dumps; and 2nd, to learn what minerals occur here and if possible see a display of them. Permission was cordially granted us but to my regret no one was around who was familiar with minerals and no specimens were on display. They have no geologist. We were advised however to collect around Mine 21 as good magnetite crystals have been found there.

Mine 21 proved to be a large open pit perhaps 200 feet in diameter, 100 feet deep and was abandoned. It was east of the office (about 300 feet) and north and adjacent to the road leading to the mines. The old underground workings showing stopes were plainly visible as was the old incline. A fence completely encircled the pit. We spent about an hour on the old dumps which were neither large nor impressive. Apatite, fluorite, magnetite (but no xls) and a nice zircon xl were the chief minerals collected. Although the mines are large and extensive, Mineville is no collector's paradise, at least the dumps around Mine 21 are not. The rocks were old and dusty; where the new material is dumped we did not inquire.

We left the mine 11:10 A. M., retraced our way back to the beacon, turned left and continued on the previous road for Port Henry, 3 miles away.

Port Henry was another delightful little town and is on Lake Champlain. A number of quarries are in its vicinity which no doubt are worthy of visits but I was interested in one mineral only—rose quartz—which Elwell[4] said must occur around here as he saw many specimens on the porches of houses. However, we did not see a single specimen although we carefully scrutinized the porches as we rode by. Nevertheless I made a number of inquiries and finally learned from Mr. Geo. Sherwood, a merchant, that rose quartz had been found in a quarry on the Colligan Farm. He kindly gave me directions to reach the quarry; also the Pease quarry.

We turned left, off the Mineville road, and headed north on the main highway. At the village limits (a sign is there), and 100 feet south, a poor dirt road leads off to the left (west) through an old gate. The Pease quarry is about a ¼ mile in on this road but we did not visit it as the gate was locked.

About ½ mile further north on the main highway, a Sunoco gas station is to the left and a dirt road swings off here to the left and up a hill. About a ½ mile up this hill, where the road and terrain flatten a little, we stopped as 300 feet to the left was the quarry.

The Colligan quarry was a disappointment. It proved to be nothing but a small prospect pit, 10 feet in diameter and 2 feet deep, in crystalline limestone, in a large open field. In the pit, however, were a number of rose quartz specimens varying from fragments up to pieces 3x3 inches. They were of good color but weathered. As no rose quartz could be found in place, the material in the pit evidently represented the remains of glacial boulders. No other mineral of interest was noted and we soon left and retraced our route into Port Henry.

I later learned, on arrival home, that fine specimens of rose quartz occured in the Roe' spar bed, 6 miles northwest of Port Henry.

We continued south on the main highway from Port Henry, on Route 9N. Five miles south of Port Henry, we saw a fairly large abandoned quarry, about 400 feet to the left which appeared to be in gray limestone and not attractive from a mineral standpoint. We would never have stopped to examine it, as it meant climbing a fence, were it not for the fact that just before we got abreast of it, another car, heading north, had stopped, a man got out, climbed the fence and was heading for it. Under the impression that he too was a mineral collector, Dr. Ever and I followed him. To our disappointment the man was not a collector, nor even interested in minerals; he was invest-

4 Elwell, Wilbur, J. *A Mineralogical Trip through Northern New York.* ROCKS *and* MINERALS, Vol. 11, No. 2, Feb. 1936 p. 21.

igating stolen cars, and finding none walked out immediately.

As surmised, the quarry was poor in minerals and we were about to walk out when Dr. Evers suddenly said, "What is that black mineral at your feet?"

"Why that's basanite and a good one." I replied, picking it up.

"If that is basanite we have tons of it here. Look there." continued the doctor.

I looked and in astonishment, for in the quarry wall, in the gray, horizontally bedded limestone, just 5 feet off the ground, was an 18 inch vein of basanite that extended 100 feet horizontally, heavily stained in parts by limonite. However, not only were tons of the mineral present but it was the first occurence of the mineral found in place which I ever saw. Basanite, also known as touchstone, is black jasper (a variety of quartz) and is common around Peekskill and elsewhere in the Hudson River Valley, but it is always found as boulders or pebbles. From my point of view, the basanite occurence was the most interesting find of the entire trip. The quarry was 200 feet long, 100 feet wide, and 20 feet deep. A smaller quarry, which contained no basanite, was 50 feet south and was 75 feet long, 25 feet wide and 10 feet deep. Aside from the basanite and limonite stains, no other minerals were noted.

Three miles further south, Crown Point, a small village, was reached. 3 miles further still a larger spar mill, built against a vertical cliff, hugged the right side of the road. We stopped to investigate but found it was not working and no one was around. Signs about the mill stated it was owned by the Crown Point Spar Co., Inc., and crushed fragments scattered about indicated that the spar was crystalline limestone. An aerial tramway could be seen extending from the mill westward over the top of the cliff to the mine or quarry which a man nearby said was ½ mile away. We soon left

A mile futher another limestone quarry, resembling the previous one. could be seen about 500 feet to the left with a road running past it. We headed for it over a dirt road, labelled "Military Road", but found the quarry void of minerals—no signs of basanite. The quarry was 100 feet long, 25 feet wide and 50 feet high, against the cliff. Dr. Evers managed to find a few fossil shells in the limestone, but they were of no special interest.

Five miles further we were in Ticonderoga, a small village made famous during the Revolutionary War but also noted for graphite mines around it. We were told at a gas station that the largest graphite mine was 5 miles west of Hague—and Hague was 10 miles southwest of Ticonderoga. We knew others were nearer but believing the one mentioned offered better possibilities, we inquired no further. We turned on Route 8, 1½ miles south of Ticonderoga and headed west for Hague. About 5½ miles in on the road, beautiful Lake George burst into view on our left and we followed it all the way into Hague, though here and there it was hidden from view. We continued on Route 8 thru Hague and soon proceeded to go up a long, steep grade—over Hague Mountain—that was practically barren of human habitation except for a few scattered natives of whom we asked for directions and were told that at the top of the mountain, at a little settlement, a dirt road led off to the right for the mines. About 3 miles from Hague, such a road did lead off to the right but it did not look so good to us and we continued on. We took the 2nd road, a mile further, which proceeded to go down a slight grade, winding through the trees for about ½ of a mile until we came to an old concrete foundation. A very poor road led off to the left here and we turned in on it and it led us right into the graphite mine a few hundred feet away. I believe that the continuation of the 2nd road would hit the main road and would prove to be the first dirt road we had passed by.

The graphite mine in its day must have been some workings but it had evidently been abandoned for a long time. Its former extensive plant was

in ruins, having been burnt down. A 75 foot stack was still standing. The mine and plant were on the northern slopes of Hague Mountain and in a desolate region. It had a large dump but from the view point of mineralogy it proved very disappointing. A few miserable flakes of graphite in gneiss and some poor garnet crystals, also in gneiss, were the chief minerals found. It is a locality, therefore, that is not to be recommended to collectors. At the extreme east end of the dump, I ran across a lot of diamond drill cores which proved more interesting than did the minerals. Almost in back of the pile of cores, approximately due south, for about 300 feet, was an old caved in tunnel, that led into the mine. Remnants of an old track extended from the tunnel out to the dump. We spent about ½ hour at the mine.

When we reached the main road we turned right and continued onward. Looking to our right, we could see the mine stack, down over the hill.

Seven miles from the mine, we passed Brant Lake, a beautiful sheet of water on our right and adjacent to the road. Ten miles further we were in Chestertown, on Route 9, and 12 miles still further we were in Warrensburg. Here we decided to make a side trip to Thurman, some distance off our route, where nice serpentine and asbestus were to be had.

We turned right for Thurman on Route 418, near the southern end of Warrensburg. About 2 miles west of Warrensburg is the junction of the Hudson and Schroon Rivers, according to signs posted, and about 1000 feet still further west we crossed over the Hudson River, via a bridge. Once over the bridge, there were no further signs regarding directions for reaching Thurman and we soon turned left and a little later, right and then by luck and a few inquiries we managed to reach our destination. However, 6 miles after we left the bridge, the macadam road ended and a dirt road with deep ruts took its place. And what a road it turned out to be. It wound in and out among the trees for 5 miles, most of it very narrow. Here and there it hugged ravines so closely that more than once we held our breath. It seemed as if we would never get to its end. Finally after a most tiresome ride, 2 or 3 houses made their appearance; then a small church, and finally the Post Office and general store. "So this is Thurman", I said to myself, as we stopped in front of the Post Office.

Thurman proved to be just a little hamlet in a sandy region, surrounded by woods, and miles from anywhere. It was not a spot to attract visitors. Perhaps I am too harsh as its citizens are very pleasant and cordial, especially one nice young lady who tried her best to assist us. However, I got out of the car and stepped into the Post Office for information. Unfortunately the Postmaster and storekeeper was hard of hearing and could not understand me. In my dilemma I turned to the young lady, sitting near the door, for assistance and she most graciously came to my rescue. The Postmaster could give me no information but she could. She had heard of the quarries and knew of their approximate location but being new in the community had not visited them as yet (the quarries were small and abandoned for many years). To my further delight, she had some knowledge of minerals, and in sympathy with our trip, and offered to guide us to a marble quarry. The young lady was Mrs. Delila Walter, the local schoolteacher. Unfortunately the quarry could not be found but we did note that precious serpentine outcropped along the road about 1,000 feet south of the Post Office.

The serpentine quarry was back along the road towards Warrensburg, but only a short distance out of Thurman, Mrs. Walter said and she gave us directions for reaching a man who knew its exact location. On parting, Mrs. Walter promised to personally visit the quarries at her first opportunity and were we to come back some day she would be glad to guide us to them. Oct. 20th, a

letter from her informed me that she had located and personally visited 2 serpentine quarries and a mica mine and that she was sending specimens from them. The specimens were very good. She will try to locate the marble quarry.

We found the man but being old he was unable to go with us. He gladly gave us directions however but unfortunately they did us no good. The quarry could not be found.

In time we reached Warrensburg where we turned right on Route 9 again and headed southward for Glens Falls, a beautiful little city of 18000, where we had dinner. Some members of the Rocks and Minerals Association reside here, of whom Dr. and Mrs. J. Stevens were personally known to me. I would like to have called on these friends but felt we were not presentable and being some distance from home we had little to spend. I knew of a limestone quarry being in Glens Falls and out of curiosity I asked our waiter if he knew of it. He did and gave me directions for reaching it. So we decided that the limestone quarry would be our last stop.

After dinner we turned left off Route 9, (the main business street in Glens Falls) on Warren Street and went one block past the first overhead light where we turned right; the road led us right into the quarry.

The quarry was working, though shut down for the day, and it proved to be a large one about 1000 feet long, 300 feet wide and 20 feet deep. The rock quarried was a dark gray horizontally bedded compact limestone which was so black and fine grained as to resemble basanite. Dolomite and calcite in crystals occur here but all we were able to collect were aragonite and calcite as white crusts on limestone and a few fossil shells.

We left the quarry 7:00 p. m. and headed for home over Route 9 which took us thru Saratoga Springs, Albany, Hudson, Poughkeepsie and into Peekskill where we arrived 12:12 a. m. Thursday, Sept. 10th, after covering 307 miles for the day. The total mileage covered on the trip was 883.

The roads through the Adirondacks are good and with very light traffic it was possible to make good time. Consequently we pushed the car to the limit. At 40 miles per hour, we were going slow; at 50 miles we would be picking up speed; at 60 miles we were going fast; but 70 miles was our average speed. And how we did go. But one time we had a close shave. We were going up a slight grade at 70 miles per hour when just a few feet away from the apex, the road swung sharply to the left. It was impossible to make the turn and it was equally impossible to stop and so we shot forward with a roar and it was not until we covered about 300 feet that we were able to stop. Lucky for us, a dirt road extended straight ahead or we would have gone right through a wall. But it was all in the day's work.

We found the people very hospitable, courteous and most friendly, but way off on their distances. Everything was measured in rods and a rod seemed to be anything from 16½ feet to as much as 100 feet.

The scenery was beautiful but the country was sparsely settled. The terrain was gently rolling and should be ideal for cattle raising but few cattle were to be seen.

The weather was ideal—so warm that we were in shirt sleeves all the time, even at night. But the localities were a keen disappointment from a mineral standpoint. I have found far more and better specimen around Peekskill than we gathered on our entire trip. Nevertheless the trip was a most delightful one and I hope to repeat it some time in the future.

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A VISIT TO GRAFTON, NEW HAMPSHIRE

A WORTHWHILE LOCALITY EASILY REACHED

By JOHN L. BAUM

During the summer of the past year, the author was fortunate, far more so than he realized, in being invited to visit friends on a New Hampshire farm near Grafton. There had been mention of a "mine" in the neighborhood, but the author was not prepared for the wealth of minerals which he found on this visit. And so it was that a brief stay on a New Hampshire farm became a collecting trip of unique opportunity.

Grafton, New Hampshire is situated in the same mineral-belt as Acworth in the same state, and while not quite as well known, has nevertheless a fine assortment of pegmatite minerals to be had for the collecting, as well as many others. Dana mentions the locality as the birthplace of some of the country's largest beryls, and it is often heard of in connection with other species of minerals, notably large muscovite crystals. The town of Grafton is located on U. S. highway 4, and may be reached easily on fine roads. It is shown on maps about thirty-some miles east of White River Junction, Vt.

There are two feldspar quarries in the township, and not far away a large but rather unproductive mica mine which is interesting, though not especially abounding in minerals. Anyone interested can get directions on how to reach the localities from the townspeople, the oldest of whom tell tales of a once fabulously productive "gem mine" which is now overgrown and hidden up in the hills.

The two quarries are situated on the hills to the west of the town. One is in operation, and the other at present abandoned. It would be good policy no doubt to see the head of the active company for permission to prowl, though the author made himself at home without exciting comment. All the men seemed friendly and were eager to help and point out minerals in place and on the dumps. However, entrance into the pit is best gained during the noon hour or after work. From the town, the active quarry may be seen high up on a well wooded slope. The road to the location leaves the highway at Grafton Center, two miles west of the town of Grafton, and continues to the right of a little schoolhouse up the valley between the hills at this point. At a clearing the road branches, and the road to the active quarry goes to the right. The left fork continues on to the other quarry. The author would advise extreme care in driving this latter road, for its condition is that of most abandoned country trails, and the ruts are liable to prove disconcerting.

Continuing on the right fork, on a fair if steep road, the driver reaches the workings after a twisting climb. Frequent shifting is necessary with most cars, but they can all do it. The author took a car that was a real "lemon" up that slope without mishap. It is best to leave the car out of the way at the very top behind the shops where there is a space available. It might be suggested here that the road is blocked on Sundays with a chain, but it is easily removed without harm if replaced. The author came down that road in a forgetful mood one Sunday, and almost connected with the barrier he had so carefully replaced a short time before.

As mentioned above, Grafton is in the same mineral-belt as Acworth, some twenty-five miles to the south. Whether this so-called "mineral-belt" runs straight between the two localities is not certain, but they have essentially the same geology. The pegmatites in each case cut metamorphic rocks, and the minerals in each instance are similar. The Grafton quarries however have more feldspar,

which is at present being crushed for a nationally known scouring powder which, despite the mineral's comparitive hardness, hasn't scratched yet.

There are well over twenty minerals reported from Grafton, and of these the most famous is beryl. The crystals are commonly opaque, and of a yellowish-green color, though pieces with clear aquamarine spots have been found. Here occur also beryls yellow, brown, or blue-green in color, but the golden-green is by far the most usual. The size of the crystals is well known; their dimensions may often be measured in feet and yards rather than in inches. While the more common of the crystals tend to be poorly formed, of unequal shape, and often bearing fragments of impressions of their neighbors, crystal faces when distinct are usually of the forms m(1010) and c(0001). These are the common occurences; the author has seen some perfect crystals from the locality, but he never was present at the discovery of any. When found, these are usually adopted by the first visitor, providing he can carry them.

Secondary in importance is muscovite mica, which occurs in large crystals or often compacted into an angular and solid mass. The typical crystal form is seen constantly, and slabs of mica well over fifteen inches in diameter are common; some of the largest sheets of mica in existence came from this locality. "Strip mica" is found here, and large pieces are interesting if for no other reason than that of their formation. A mica crystal interrupted in its growth, and proceeding again, forms a jointing along each crystal face, at which the mica tends to break. Strips come off, leaving smaller but similiar crystal. Biotite occurs here, but not in quantity. It is subject to the same strip formation. though it has smaller crystals.

In connection with the muscovite mica there occurs manganite in dendritic form. Between sheets of the muscovite the oxide takes a definite cross pattern, which is almost as striking as the regular dendrites to be found at this location. Whole groves of tree—and fernlike forms are not at all unusual, and they stand out sharply against the white feldspar background.

Work done during the past summer revealed what might be called a vein of autunite. Previously present only in small quantities, this mineral is now abundant, and the author had no trouble in getting fine scale-like masses on practically every mineral which is here mentioned. It is needless to mention the fluorescence of the mineral at this point, for everyone knows of its brilliant reaction to ultra-violet light. With autunite there occurs gummite, likewise an alteration product of uraninite.

It is needless to mention the microcline, which is white, pink, and green, some of it neatly laminated,- or the quartz, which occurs finely scattered through the microcline and as crystal masses, compact chunks the size of a fist.. But the graphic granite is worth noticing; striking and clearly outlined the quartz "hen tracks" furnish an ever changing design against the white microcline.

Derived from microcline probably is the montmorillonite which is a bright pink, although it gets pale in a short time. It requires careful handling, being extremely delicate. Another interesting mineral is graftonite, a local phosphate of calcium, iron and manganese, which occurs with triphylite, another phosphate, in fine intergrowths. Related is the apatite in greenish crystals, which should not be confused with beryl, which it closely resembles in these pegmatites.

A showy mineral is black tourmaline, which is common yet hard to get. The paradox is clear to anyone who has tried to remove a large tourmaline of this type, only to see it disintegrate into "coal dust". Care in collecting these large well-terminated crystals is well rewarded, however, and a coat of lacquer is an added precaution which serves well to keep the mineral together. Distorted and flattened crystals are available and interesting in the matrix, and a

tourmaline schist is a novel addition to any collection. This schist is a sort of dark sandstone, laden with black crystals having fine faces, but a coarse composition. A mass of this material may be worked into a nice specimen by cutting out the sandy matrix and cleaning the crystal faces.

Garnets are another of the many Grafton minerals to have won immortality in Dana's **Textbook.** Almandite in crystals and masses is plentiful, usually with pyrite and chalcopyrite. Melanite, a black variety of andradite, comes isolated in feldspar, in which it is nicely set off, though it is hard to break out. The crystals of the latter are fairly small, none being observed by the author of more than one half an inch in diameter. Some of them may grade into the grey-black variety pyrenite, although this conclusion is not warranted by the author's observations. It is merely a tip to be followed on the next visit.

While giving tips and hints, the author might suggest that the collector keep his weather eye, or in this case his collecting eye, open for clinochlore, microcline, peristerite and other common minerals. The author can guarantee that there are other minerals besides those mentioned here at Grafton; his visit, though extended to twice its actual length, could never have done justice to the minerals of Grafton, New Hampshire.

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THE MINERALS OF WEST PITTSTON, PA.

By M. ALLEN NORTHUP

The writer spent his vacation this summer in the northern end of the anthracite coal belt of Pennsylvania at West Pittston. Two weeks of fair weather afforded a fine opportunity for mineral collecting, a number of trips were made and some very interesting specimens were found.

The nearest mine to West Pittston was one which had been recently reopened by the Sullivan Trail Coal Co. after years of idleness during which time the old culm dump had been removed. Thus the bigger pieces of rock taken out in preliminary excavation were all exposed and none of the material had undergone much weathering.

On one side of the dump were found several large chunks of a very carbonaceous clay ironstone having vugs filled with white and stained Calcite rhombs up to ¼ inch, as well as Quartz crystals about an inch long, and some yellowish, very flat rhombs about 1/8 inch with a greasy luster. These last proved to be a carbonate of ferrous iron and magnesium containing no calcium, and with the bases present in about equal proportions to judge from the amount of precipitates obtained in testing. The mineral is therefore either a magnesium containing Siderite or a ferriferous Magnesite, that is, Breunnerite. The Calcite crystals contained both iron and magnesium in small amount, in contrast to a black cleavage mass from the same place which contained the three bases in almost equal proportions, being, therefore, a ferriferous Dolomite or Ankerite. The Quartz crystals were remarkable for their clarity and the presence of trapezohedral faces. A very distinct series of "growth rings" were observed on the broken butt of one. Tiny crystals of smoky quartz were also present.

Another piece of the same clay ironstone had an open vein partly filled with Pyritohedral crystals of Pyrite about 1/8 inch square. Drusy incrustations of Chalcopyrite were also found here. Gordon in "The Mineralogy of Pennsylvania" mentions an occurence of Millerite in similar association at a mine in Scranton, but none was found around West Pittston.

Inclusions of fireclay up to two inches in diameter also occur in the same clay ironstone.

As at all the mines in this region, much Pyrite occurs in a variety of forms, the most common being a massive fine granular admixture with coal and slate. Distinct crystals are rare and, usually as striated cubes. An interesting pseudo-fibrous form was found, probably due to the replacement of plant fiber remains by microscopic Pyrite crystals. Small spherical aggregates made up of cubic crystals also occur in coal and slate. Concretionary forms are common, one the size of a basketball having been seen at another mine, but not collected. Once in a while radiating columnar aggregates of crystals occur in a soft grey slate. These show brilliant little square terminations when the slate is split off, and are much sought after by local manufacturers of novelties who make them into "sulfur stone" jewelry.

It is interesting that very little Pyrite was observed altering to Limonite. This is due to the exposure to air and good drainage afforded by culm heap conditions which favor oxidation to sulfates. Since these products are quite soluble, they must be dissolved away by every rain; so that no extensive deposit would be found except in continued dry weather. A few specimens were found having coatings of very small white acicular crystals which, from their appearance and solubility, were probably Melanterite or Coquimbite. Unfortunately enough of this mineral for analysis was not saved. Numerous fragments of cubic crystals which had been

pitted and rounded by this type of weathering were found.

Many other culm heaps in this region were visited with only a few specimens being collected. One mine at Exeter, Pa., yielded clay ironstone containing bands of light grey cleavable Ankerite or ferriferous Dolomite. Groups of small brown pure Siderite crystals with Quartz crystals on sandstone were found at an old working between West Pittston and Exeter.

One of the most interesting localities from the standpoint of the collector is a very old and deeply weathered culm heap above Pittston on the east bank of the Susquehanna river. Small veins of crystalline Calcite in coal were found here altering to a soft pulverlent form of Gypsum, and much of the material in the lower levels of the heap is coated with tiny Gypsum crystals and iron oxide. On splitting open numerous pieces of slate, several were found having flattened radiating groups of shiny Gypsum crystals in the cracks, one such group being about an inch in diameter. These crystals show pointed or oblique terminations and no other faces at all as they are greatly flattened by having been deposited in such a confined space. Coatings of white globular earthy Magnesite and similar grey ones of Calcite on coal also occur here, as well as isolated Pyrite cubes ¼ inch square partially weathered out of clay ironstone.

This culm heap is being removed and reworked for its small size coal, which was formerly discarded because of lack of sale; so that in places the interior of the heap all the way to the ground is exposed. A yellow to bright orange red, opaque, waxy, globular mineral up to 1/8 inch in diameter, was found coating the rock in one of these exposed sections. Analysis showed ferric sulfate with so much water that the substance boils

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WULFENITE - New Mexico — Light yellow xls on matrix. Well worth your attention — 1" 30c; 1½" 60c; 2" $1.00; 3" $2.00 — Also other specimens at about half these prices.

Other attractive minerals: Descloizite, Benetoite, Cinnabar, Sodalite, Tourmaline, Realgar, Smithsonite, Rhodochrosite, Purpurite, Mariposite, etc.

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in its own juice when heated in a closed tube. The lighter yellow specimens contained a little magnesium and silica, and all were completely soluble in cold water. They have been preserved under kerosene to prevent loss of water. Of the number of ferric sulfate minerals known, this one corresponds most closely to Ihleite, the dodecahydrate. Lack of rain as well as the moist and protected position in which this mineral was found was all that kept it intact. A heavy rain would have dissolved it away or longer exposure after excavation might have caused it to lose most of its water. Dried up looking masses of the same general appearance were seen at a number of other localities, but not in any quantity.

The most conspicuous culm heap minerals having been pretty well investigated, the writer decided to look for whatever he could find in the surrounding countryside.

An interesting occurrence of arborescent growths of microscopic Gypsum crystals was found incrusting the underside of an overhanging sandstone ledge on top of a mountain north of the town. Some of the bunches projected half an inch beyond the rock, but were too fragile to collect and flatter pieces had to be taken. Large greyish green, opaque concretions with sub-conchoidal fracture and, dull waxy luster occur in the same sandstone at the foot of the mountain. This mineral is an insoluble silicate, apparently related to Kaolin.

About a mile west of the town of Pittston in a cut of the Lehigh Valley Railroad there is a very extensive deposit of Quartz crystals in the jointing cracks of a sandstone formation. These are mainly thick growths of slender prismatic crystals about ¼ inch long with perfect terminations, many of them showing trapezohedral faces. Some much thicker and longer crystals occur here but most of them have crystallized across narrow jointing cracks and are not terminated, although a few growing parallel to the cracks are doubly terminated.

Although not a mineral belonging to this region it is interesting to note the occurence of small cleavage masses of Sphalerite in the road bed material at the above locality. The stone, a grey limestone containing large flint concretions and many fossil corals, is not found anywhere in the neighborhood and was probably quarried to the north of Pittston along the Lehigh Valley Railroad.

Foot Note:— Since the above was written, the author has found another mineral at this locality, namely, a greyish white, slightly globular encrustation on slate from the mine between West Pittston and Exeter. Analysis shows it to be a hydrated magnesium sulphate with a small amount of ferrous iron. It probably corresponds more closely to kieserite than anything else.

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A MINERALOGICAL JOURNEY THROUGH BOHEMIA

By F. W. CASSIRER

(Mr. Cassirer is a newspaper man in Prague, Bohemia and a mineral collector with many years of experience.)

Scarcely a country shows on such a narrow territory so variously different and interesting geological and mineralogical occurrences as does Bohemia. There are many good opportunities not only to observe rock formations but to collect minerals at mine and quarry dumps. We will confine this journey to that part of Bohemia which is situated to the northwest of Prague, the beautiful capitol of Czechoslovakia. The territory in question is north of latitude 50 deg. north and west of the river Moldau with an area of 10,000 qkm. It contains the most important coal deposits of the country, the world famous health resorts Karlovi Vary (Karlsbad) and Marianske Lazne (Marienbad) and the world famous radium-bearing ores of Joachimsthal. The total extension of the territory is small, the furthest distance being no more than about 200 km. (124 miles.) However we need more than the usual time to travel as rail connections are not very good and localities often are off the main highways. By car, you can visit practically all localities with more ease and comfort than by train.

Czechoslovakia is entered from Germany at Cheb (Eger), an old historical city. Close by to Eger at Haslau, is a locality for a specific Bohemian mineral, **Egeran (Vesuvianite)** which occurs in radiated crystals, similar to those found in Maine, U. S. A.

We follow the valley of the river Eger which drains a rich and very charming landscape. The river shows many rapids and abruptly downfalling rocky shores. In three quarters of an hour the express brings us to Karlovi Vary (Karlsbad.) On the boards of the famous hot geyser in the city, we find **Aragonite** sinters, the so called pipestones or Karlsbader Sprudelsteine, which gives a very fine and decorative stone when cut and polished.

On the way from Karlsbad to Marienbad, in the valley of the river Tepla (Tepl), we find, not far away from Karlsbad, near Elbogen, the worldwide known **Karlsbader Orthoclase twins (Karlsbad Orthoclase twins).** The crystals fall out of a weathered granite and are found when the fields are ploughed in the spring. Most of the fine crystals are cut into pieces by the ploughs.

Not far away at Horni Slavkov (Schlackenwald) are tin and wolfram mines which in their days were most important but which have long since been shut down. Splendid crystals of **Cassiterite** and **Wolframite** used to come from these mines and they may now be seen in all important collections throughout the world. A retired manager of one of the mines, with some unemployed miners, is sinking a shaft in preparation to reopen one of the mines. But with foreign competition, especially Asia, they hardly stand a chance to make it a paying proposition. However, this gives employment to some of the poor miners; it is also possible that many fine specimens for our collections may be thus uncovered.

Not far away large deposits of **Caolin (Kaolin),** the raw material for the important porcelain industry of the Karlsbad district, occur.

A short distance out of Marienbad is a well-known holy chapel Tepla (Tepl) that was founded in 1193 by the Praemonstratienser Convent. This contains a library of 60,000 handwritten volumes, and a mineral collection which contains a fine **Meteorite,** found in Tepl in olden times. Another and a large meteorite, which fell in Elbogen in 1400 A. D., represents the first meteorite ever seen to fall in the whole world, as far as records show. This chapel and its mineral collection is worthy of a visit.

We continue our journey through the valley of Eger. Then we make an excursion to Jachimov (Joachimsthal) in the Ore Mountains. Here

we find the first mine which has produced and still produces **pitchblende.**

Formerly this mine was the only source of radium for the entire world. It still today contains the richest deposit of radium and uranium ores in the world. Although it may be that the Bohemian mines must be given up some day, as latest news from North Canada and Alaska state ores have been found there which are very rich in pitchblende, nevertheless, the latest finds, especially those near Great Bear Lake in Canada, are so far off from civilization that the ore has to be transported by airplanes, a most costly undertaking. Due to the high content of the ores of Joachimsthal, the mines are heavily guarded and a visit to them can be made only by special permission.

South of the railroad line, in a charming range of hills devoted chiefly to the raising of hops for beer, we find hidden in the middle of a forest a pilgrimage church called Walssch Valec (Waltsch). A short walk of an hour brings us to a nearby hill, a former volcano, covered all over with lava tuff. Here we find the Bohemian **Glassopales (Hyalite Opal)** which often are called Crown Hyalites from their cup or crown-like form. Formerly it was only necessary to lift up the vegetable earth and you would find specimens of the choice mineral grown on their volcanic matrix. These old finds are now exhausted and to obtain specimens we must dig deeper into the terrestrial earth.

Quite near, as the crow flies, but in reality passing over many poor mountainous roads, our car brings us to a so-called alum lake near a small town called Chomutov. Quite close to the town many nice specimens of **chalcedony, jasper and petrified wood** may be collected. Here we meet the skilled huntsman's boy of Count Silva Tarouca, member of one of the oldest and richest aristocracy of the country. He brings us to a clay pit, where clay, loam and different colored sands occur in layers, just like a drawing in a geological compendium. The layers contain large number of **Gypsum Crystals** in the form of roses. The crystals show a large number of forms, stripes, deformations, etc. which until now have not yet been described. The same pit contains the rare mineral **Tschermigite,** an ammonia alum.

Between Duchov and Most, we pass a great lignite district, which from the standpoint of mineralogy, especially from a collector's viewpoint, is not much of interest. The scientific mineralogist, however, would be interested to find on the walls of the galleries and on the dumps. many secretions of sulphur and selenium. Not far away, still in the coal district, there occurs in Bilina (Bilin), an interesting locality for **Aragonite.** The crystals are small, 2 to 5 cm. in length, clear shaped with interesting brachy-pyramids, honey colored and grown on the flaws and clefts of the younger eruptive basalt rocks.

Nearer to the Ore Mountains, close to Teplice-Sanov (Teplitz), at an old mine shaft now filled with water, large showy barite crystals that were strongly radio-active, used to occur. Specimens are no longer obtainable.

In half an hour's drive, we reach the two old mining towns of Cinvald (Zinnwald) and Krupka (Graupen), once the most famous mines for tin and wolfram, the classical localities for **Cassiterite, Wolframite, Scheelite, Zinnwaldite, Fluorite, Apatite,** very showy and most interesting deformed **Rock Crystals.** Today there is no work and the mines are shut down. The few tourists who visit this woodland of about 1,000 m. (about 3250 feet) high and lumbering give a small support to many of the unemployed miners. During the World War, one of the mines was in operation but now it too is shut down and the poor miners are waiting for better times.

Another half hours drive and we are in Trmice (Turmitz) where we visit one of the finest mineralogical museums in the Country that is especially rich in Bohemian minerals. Quite close by is the large industrial center Usti na Labe (Aussig on the Elbe). The chemical and the soap industries, the world wide known firm of Schicht are concentrated in this city. We are more interested in the phonolite quarries of Marienberg and the quarries of

Neubauerberg, on the opposite side of the river. These quarries have been mineralogically famous for many years. Very fine specimens of the zeolites **Analcite, Apophyllite, Natrolite, Thomsonite** occur here. Fine specimens of **Aragonite** and **Calcite** in various crystal forms and many other species of minerals are known. The zeolites are so perfect in point of view of crystallization and coloring that they can easily stand in comparison with splendid zeolites from other famous localities of the world, Iceland and New Jersey for instance. This is the reason why in all important international mineral collections, splendid suites of Bohemian zeolites will be found. The quarries, unfortunately, are not working now but they are not shut down permanently; when they open up again, zeolites and other minerals will again be avilable for collectors.

Some kilometers down the river Elbe, near the little town of Salesl, situated in a charming landscape, is another quarry where basalt is taken out for the construction of roads. Minerals, similar to those found at Aussig, occur here. And in addition, other zeolites as **Scolecite,** Phillipsite and the the very rare **Gismondite.** This quarry is also the chief locality of Bohemia for splendid specimens of white **Natrolite,** which occurs in needle-like crystals.

Quite similar are conditions at another famous locality at Ruebendorfel which has been visited by nearly all European mineralogists in search of **Chabazite.** The quarry has been closed for over thirty years and is now overgrown with bushes, and trees. It is owned by a peasant who is not friendly to collectors so it is pretty hard to collect specimens. Nevertheless the locality is interesting to visit even if no specimens can be collected as we find here sandstone columns, 5 cm. in diameter and up to 1 m. in length which had been formed at high temperature in contact with basalt.

Further southwards, towards Prague, are deposits of another world-famous mineral, the **Bohemian Garnet, var. Pyrope*.** The garnets occur in a basalt breccia and are brought to light by digging, washing and picking out of the alluvial gravel. They occur as small, formless grains, never showing crystal faces. Cut and polished they make a very fine semi-precious stone that are in popular demand for all kinds of jewelry and have been distributed all over the world.

Still further southwards and nearer Prague are the great coal mines of Kladnov. Aside from the common mineral Pyrite, there is found from time to time at the mines fine **Millerites** in hairlike crystallizations and rather large **Whewellite.** In a basalt quarry near by occur fine **Aragonites, Calcites** and **Thomsonites.** Not far away in sandstone are **Wavellites** and **Kakoxen (Cacoxenite).**

Prague is surrounded by limestone quarries in which fine calcite crystals occur. The region around the city is very interesting from a paleontological point of view. The **Orthoceros** Marble is noted for its one meter long petrifactions. In fact the region around the city has been named in honor of the paleontologist, Barrende, and is a real eldorado for an investigator and collector.

Turnov (Tarnau) is the center of the Bohemian agate industry. Here agates are cut and polished, many of which come from nearby Mount Kozakov, which is one of the best localities in the country for **Agates, Carnelians, Chalcedonys, Jaspers, etc.** The variety of these Bohemian stones, their nice bandings, and natural colors, beginning from whitish white through milk white and all colors and shades to the deepest black, have made this locality widely known, especially as the specimens are still obtainable and are not too expensive.

This sector, not in any way complete, may show how very interesting the Czechoslovakian Republic is for every mineralogist. Besides this sector represents only 1/14 of our country; other sections are equally interesting to mineralogists and geologists.

* *Bohemian Garnets.* by Charles R. Toothaker. ROCKS *and* MINERALS, June, 1933 Vol. 8, No. 2, pp. 92-93.

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*Author of—*The Working of Semi-Precious Stones*, and *Handbook for the Amateur Lapidary*.

MORE NOTES ON GEM POLISH

By J. H. HOWARD

Dr. Frank Wade, in the November issue of ROCKS and MINERALS called attention to an interesting theory involving "molecular flow". Whether the theory can be proven or disproven, it still is interesting and worthy of study.

The purpose of this paper is not to present arguments for or against but merely to list some comments that have appeared from time to time on the subject. These comments are all taken from that remarkable volume "Amateur Telescope Making", edited and largely written by Albert G. Ingalls and published by the **Scientific American.** Full credit is hereby given that work for all material contained herein. I have tried to avoid distorting the sense of any of the matter handled. But lack of space has made it necessary to greatly condense much of it that is interesting and pertinent. In doing this some wording has been changed and some quotation marks that should have been used may have been omitted.

F. W. Preston, in "Glass Industry" Feb. 1928 says, "The process by which a ground or smoothed surface is turned into a polished one has been the matter of a good deal of debate. Some contend that the ground surface is liquefied by the drag of the polisher and as it were, smeared about like butter on bread. Others contend that polishing is really just an exceedingly fine grinding operation".

Is polishing simply a case of ordinary abrasion on a fine scale or is it something else, perhaps molecular flow? Several discussions of this matter are contained in early issues of Transactions of the Optical Society, (London). A lecture by Dr. L. C. Martin of the Imperial College of Science and Technology and published in the Journal of the Royal Society of Arts August 12 and August 19, 1927 under the title "Recent Progress in Optics" summarizes the different theories. To quote; "In 1907, G. J. Beilby described researches on the nature of the polishing process ***** He distinguished this as very different from grinding. Herschel had believed that the final polishing was merely a very fine grinding ***** Beilby showed however more especially with regard to the polishing of speculum metal that the polishing action consisted, in part, of a flowing action which would cover over the irregularities of the surface. The skin of the material he concluded, owed its nature and stability in all cases to the surface tension, a conclusion markedly different from that of Lord Rayleigh, whose view in 1901 was that the polishing of glass consisted of an almost molecular wearing away of the highest parts of the surface and who had supported this view by proving that a thickness of glass equivalent to 6 wavelengths of light (1/10000 in.) was removed during the polishing as distinct from the fine grinding process".

"In more recent works by the British Scientific Research Association, the depth of the deepest pits in a finely ground surface was examined microscopically. The results showed that irregularities of the order of 6 to 8 wavelengths or more are present in such surfaces, thus indicating again that polish is only complete when th surface is removed to the

depth of the deepest pits, when Lord Rayleigh's observation is borne in mind."

"J. W. French, writing in 1916 suggested that the surface layer of a polished piece of glass consisted of a portion that had been caused to flow, more or less, under the strong surface forces of the polishing operation.

This layer, which he termed the 'Beta Layer' was considered, from evidence based on the study of fire cracks, to be about 8 wave lengths deep".

Dr. Elihu Thompson has been an amateur worker in glass for 60 years and being a scientist has naturally given much thought to this matter. He states;

"The problem of how it is that, for example, a glass surface that has been smoothly or finely ground can, by proper means, be polished not only so as to be invisible ordinarily, but so that under the severest tests it shows no diffusion of light (as of the sun's rays falling on it) has at times engaged the attention of the ablest physicists. The late Lord Rayleigh studied the matter. ***** He properly explained the polishing process on the principle of removal, by a process similar to grinding, of the high points of the surface, and progressively so until the whole ground surface has been cut away, but the cutting is by an action so fine that the grain produced is beyond the power of resolution by a microscope or other powerful optical means."

"It is the purpose here to show that while this view is measurably correct it does not go far enough and that the polishing is a unique mechanical process; a self regulated planing down of the surface to a real level without even the finest scratches.

"Some have erroneously tried to explain the result of the process by assuming that the glass has, during the polish, actually flowed or that there was some peculiar plastic condition brought about which allowed the glass surface being polished to take on the characteristics of a liquid surface. There is no need for such hypothesis and no validity in such assumptions. This will be made clear."

"In burnishing of plastic metals by a hard burnisher, there is of course such flow, but with hard, brittle nonmalleable materials like glass the process is decidedly not like burnishing".

Dr. Thompson then goes into a discussion of polishing lenses with rouge on a pitch lap, the commercial polishing of plate glass and so forth, the details of which discussion are not pertinent to our study of gem polishing on a hard lap. Then he continues;

"In grinding, the surface is crushed, while in polishing it is clean cut. Smooth cutting is the rule. The polishing is indeed a kind of planing process, the particles of rouge set themselves into the pitch surface and cut smoothly, they do not roll or grind *****.

"No matter what degree of smoothness has been attained in polishing, the continued smooth removal of the glass surface goes on as long as there is rouge, pitch and water applied, a fact which is of course taken advantage of in parabolizing a concave astronomical glass mirror".

So there are two definite schools of thought. Will tests, such as suggested by Dr. Wade, be conclusive?

J. H. Howard.

FURTHER NOTES

A later note from Dr. Wade somewhat changes the complexion of his article in the November "Amateur Lapidary Department" but does not make it any less interesting. He writes;

"Apropos of my note on the cause of a polished surface in which I suggested that the surface layers were caused to slide or flow and thereby produce a colloid or amorphous layer on the stone, may I add that I have just learned that there have been papers published in the Physical Review within a year or so in which the very thing I suggested, was done. Namely, the photographing of an X-ray pattern from both a polished and a cleavage surface of the same mineral in the same optical relations. It was reported that the polished surface gave a less well defined pattern than the cleavage surface but that, **when the surface was**

(Continued on page 29)

A PEEK AT OUR MAIL

Will Win Recruits!

Pilgrims Rest, Transvaal — Although I have not read every article in the Special Agate Number as yet, I must really congratulate you on the production of this very, very fine issue. I am sure that it will not only lead to great numbers of collectors taking more interest in agates but will be the means of winning recruits to the happy band of rock and mineral collectors. — Ernest M. Skea.

Knocks Them Cold!

Faribault, Minn. — The Special Agate Number is undoubtedly the finest and most complete issue on agates that I have ever seen; in fact I can see no way for improvement. I showed it to a local teacher who was so overcome by it that I was forced to sell it. I am therefore ordering another copy as I would not be without it. — Fred McAtee.

A Major Contribution!

Chicago, Ill. — Your Agate Number was the finest thing I have ever seen in this line. Unquestionably it will be a major contribution to the scientific knowledge of this fascinating gem stone — K. D. Griswold.

Collectors, Take Notice!

Cleveland, Ohio — I wish to congratulate you on the Agate Number. It contains much valuable information and should be on the bookshelf of every mineral collector. — Gerald U. Greene.

A Pat On The Back!

Michigan City, Ind. — I want to congratulate you on the greatly improved appearance of the last three issues of ROCKS *and* MINERALS. Getting away from that same old quartz xl group on the cover ought to bring in at least one hundred new subscribers. I can't offer advice as to how you should run the magazine; but I can "pat" you on the back when you make a move that I would like to have seen made long, long ago and that is what I am doing. I hope you grow to have a circulation like that of the *Saturday Evening Post* — R. W. Tuthill.

A Gold Mine of Information!

Salt Lake City, Utah — The Agate Number arrived three days ago and I spent a most happy and profitable two hours reading it through. It is surely a gold mine of information on the subject of agates. I know of no other source where a person could go to and get so much information in so short a time on this particular type of minerals — Junius J. Hayes.

An Article of Beauty!

New York, N. Y. — I would like to say how very enthusiastic I am about the magazine as you are now publishing it. It was always worth while but now it is an article of beauty, one to be proud of having on the library table. I have been a member of your organization for just the right number of years to have seen the growth in the make-up of the magazine. The depression has made me give up many things I wanted but not ROCKS *and* MINERALS. Let me wish you many more years of progress with myself as a member. — Miss Maud L. Ransom.

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Santa Anita, Calif. — Being a reference librarian by profession, I meet a great number of people interested in minerals and it may give you some satisfaction in the knowledge that ROCKS *and* MINERALS gives joy to many. My copies of Rocks and Minerals go all over the State, out on the desert and mountains, and sometimes even further, in the ragged pockets of boys who need every encouragement to fill their minds with other thoughts than the bewildered and too often bitter ones that darken them. I lend copies to others of course to acquaint them with ROCKS *and* MINERALS but if they can afford to subscribe I demand them back very soon. I never know where my copies are but they are always returned, sometimes after many months. — Mrs. Anita L. Alexander.

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THE AMATEUR LAPIDARY

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etched with acid, thus removing the polish, a clear pattern was obtained. Calcite was used.

"A former pupil of mine, Mr. Bernard Vonnegut now a teaching Fellow at Mass. Inst. of Technology, suggested to me recently that an electron diffraction pattern similarly produced, might give even more conclusive evidence as its penetration would be less. I believe that the latter method will reveal the presence of an adsorbed layer of gas on a solid surface. Now, will someone with the proper apparatus and technique please try the experiment with electrons?"

LATER NOTE

Dr. Wade writes; "Quoting a paper by R. C. French in **Nature,** Jan. 30th, 1932 to the effect that an electron diffraction study of the surface of a polished metal showed that the copper atoms must have been **flowed into a random arrangement** different from their orderly positions in the cubic lattice, etc."

This note while interesting does not of course constitute any evidence that there is an atomic flow in the polish of a gem. It has long been thought, and is probably rather generally accepted that the burnishing of metal does involve such a flow. However the note is of especial value in that it indicates that the test method proposed is workable and practical.

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